UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte BRUCE BRYAN

Appeal No. 2006-0381
Application No. 09/729,133

ON BRIEF

Before SCHEINER, GRIMES, and GREEN, Administrative Patent Judges.

GRIMES, Administrative Patent Judge.

DECISION ON APPEAL

This appeal involves claims to a bubble-blowing composition containing a bioluminescent fluorescent protein, which the examiner has rejected for obviousness. We have jurisdiction under 35 U.S.C. § 134. We affirm.

Background

The specification discloses "systems for producing bioluminescent light, and to combinations of the systems with articles of manufacture including toys, textiles, food and beverages, to produce novelty items." Page 1. Sources of bioluminescence include various luciferases (see pages 27-30), aequorin (see pages 34-40), and any of several fluorescent proteins (see pages 58-62). "GFPs [green fluorescent proteins] are

activated by blue light to emit green light and thus may be used in the absence of luciferase and in conjunction with an external light source with novelty items." Page 59.

"Soap bubbles are blown from water solutions or other aqueous composition containing soap or another surfactant. . . . Such compositions, preferably those that have near neutral pH, can be combined with the components of the bioluminescence generating systems." Page 113. "[A] fluorescent protein, such as GFP, BFP [blue fluorescent protein] or a phycobiliprotein, may be added to the bubble-making composition and then illuminated using an external light source. For example, bubbles containing a fluorescent protein may be produced in a room illuminated with light of an appropriate wavelength to cause the fluorescent protein to fluoresce." Page 114.

Discussion

1. Claim construction

Claims 1-3, 5, and 8-14 are on appeal. Claims 4, 6, 7, 9, 11, and 15-21 are also pending: claims 9 and 11 have been objected to but not rejected, and claims 4, 6, 7, and 15-21 have been withdrawn from consideration by the examiner. In addition, for the generic claims, the examiner required Appellant to elect a single article of manufacture for examination on the merits; Appellant elected the species of bubbles, bubble-making toys, and bubble bath. See the response filed December 11, 2002.

The claims on appeal stand or fall together. See the Appeal Brief, page 3. We will focus on claim 5, which is representative. Claims 1 and 5 read as follows:

1. A combination, comprising:

an article of manufacture; and a bioluminescent fluorescent protein, whereby the combination is a novelty item.

5. The combination of claim 1, wherein the article of manufacture is bubbles, a bubble making toy or bubble bath.

Claim 5 is directed to the combination of a bioluminescent fluorescent protein and, e.g., "bubbles," which we interpret to include a bubble-making composition. The recited "bioluminescent fluorescent protein" includes GFP, BFP, and phycobiliprotein (specification, page 114) but does not include luciferase: claim 19, which has been withdrawn from consideration, depends on claim 1 and adds the limitation that the combination "further compris[es] a luciferase, a luciferin or a luciferase and a luciferin."

2. Obviousness

The examiner rejected claims 1-3, 5, and 8-14 under 35 U.S.C. § 103 as obvious in view of Halbritter[1] and Prasher.[2] The examiner reasoned that Halbritter teaches bubble-making solutions containing a chemiluminescent light-generating system, and that Prasher teaches that the A. victoria green-fluorescent protein is "highly fluorescent" (Prasher, abstract) and "stable to a variety of harsh conditions including heat, extreme pH, and chemical denaturants" (id., page 230, left-hand column).

The examiner concluded that it would have been obvious to substitute the fluorescent protein taught by Prasher for the chemiluminescent system used by Halbritter. The examiner found that Prasher's teaching that A. victoria GFP is stable to a variety of harsh conditions would have suggested its inclusion in a bubble-making solution, "which will include surfactants and that may be stored under a variety of conditions by consumers." Examiner's Answer, page 5.

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[1] Halbritter, U.S. Patent 5,246,631, issued September 21, 1993
[2] Prasher et al., "Primary structure of the Aequorea victoria green-fluorescent protein," Gene, Vol. 111, pp. 229-233 (1992)

We agree with the examiner that the cited references would have suggested bubble-making solutions comprising A. victoria GFP to a person of ordinary skill in the art. Those skilled in the art would have recognized that chemiluminescence and bioluminescence are alternative means of generating light. In addition, as noted by the examiner, Prasher teaches that A. victoria GFP is stable to (i.e., retains its activity in the presence of) chemical denaturants. In the recombinant protein field, surfactants are recognized as protein-denaturing agents. Thus, the teachings of the references would have suggested the substitution of A. victoria GFP – a bioluminescent protein that is stable in the presence of surfactants – for the chemiluminescent agent used by Halbritter.

Appellant argues that Prasher does not provide "explicit or implicit support" for the examiner's statement that A. victoria GFP is stable in the presence of surfactants. Appeal Brief, page 4.

This argument is not persuasive. As noted above, surfactants – which are also known as detergents or soaps – are well-known protein denaturing agents. Halbritter teaches that "bubble blowing involves dipping a ring-shaped article into a liquid soap solution." Col. 1, lines 13-15. See also column 2, lines 45-55: "Suitable bubble blowing solutions may include anionic, cationic, non-ionic and ampholytic surfactants. . . . Solutions containing conventional surfactants, such as sodium laureth sulfate or ammonium laureth sulfate may be utilized." We agree with the examiner that the class of "chemical denaturants" described by Prasher would have been recognized by those skilled in the art as including the surfactants described by Halbritter as a necessary component of bubble-making solutions.

Appellant also argues that bioluminescent systems and chemiluminescent systems are distinct:

> Often substances present in a chemiluminescent system are incompatible with the bioluminescent fluorescent proteins of bioluminescent systems. For example, the Halbritter '631 reference teaches that "the preferred chemiluminescent agent includes an oxalate diester which reacts with a peroxide and a fluorescer to provide the emission of light." . . . When peroxide contacts a bioluminescent component, such as a fluorescent protein, it destroys the coelenterazine necessary to allow the bioluminescent reaction to take place by destroying the oxygen. Accordingly, one skilled in the art would not replace the chemiluminescent system of Halbritter '631 with a bioluminescent fluorescent protein.

Appeal Brief, page 5.

We find this argument unpersuasive, for the reasons discussed on pages 11-15 of the Examiner's Answer. To summarize, unlike luciferase, GFP does not require oxygen and a substrate (e.g., coelenterazine) to generate light. See the specification at page 36 ("The native [aequorin] protein contains oxygen and a heterocyclic compound coelenterazine, a luciferin, . . . bound thereto. . . . Upon addition of trace amounts Ca^{2+} . . . , it undergoes a conformational change th[at] catalyzes the oxidation of the bound coelenterazine using the protein-bound oxygen. Energy from this oxidation is released as a flash of blue light.") and page 59 ("GFPs are activated by blue light to emit green light and thus may be used in the absence of luciferase and in conjunction with an external light source.").

In addition, the basis of the rejection is not that it would be obvious to add the A. victoria GFP to the chemiluminescent system described by Halbritter; there would be no need for A. victoria GFP in the bubble-making solution if the chemiluminescent system were retained. The examiner's rejection is based on the obviousness of

"replacing the entire chemiluminescent system (i.e., all of the oxalate diester, the peroxide and the fluorescer in the preferred embodiment of Halbritter) used with the bioluminescent fluorescent protein of Prasher." Examiner's Answer, page 15. Thus, any potential incompatibility between the A. victoria GFP and the components of Halbritter's system would not lead persons skilled in the art away from combining the cited references.

Summary

The examiner has made out a prima facie case of obviousness, which Appellant has not rebutted. We therefore affirm the rejection of claim 5. Claims 1-3 and 8-14 fall with claim 5.

AFFIRMED

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